



European  
Commission



# NECPs – Research, Innovation and Competitiveness

5th Energy and Climate Technical Working Group

08 October 2020

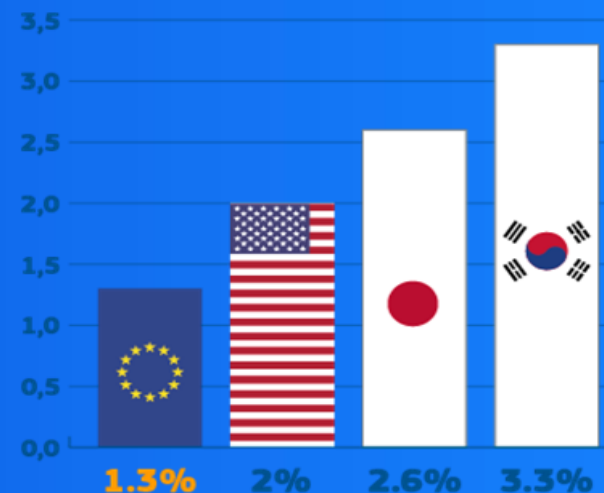


While benefiting from world-class research and strong industries...

**7%** of the world's population

**20%** of global R&D

**1/3** of all high-quality scientific publications



...Europe fails to transform leadership in science into leadership in innovation

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# Research, Innovation and Competitiveness: a key dimension through the evolving EU energy policy

- Energy Union
- Strategic Energy Technology Plan (SET Plan)
- Clean Planet for All
- European Green Deal



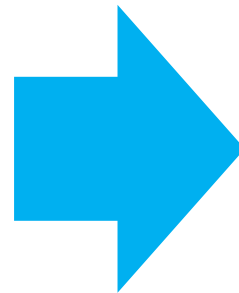
Identify the **strategic research and innovation priorities and actions** needed at EU level

The NECPs are intended to set out which of these objectives are being pursued nationally and how are being implemented

MS need to prepare and **take advantage** of the energy transition

NECPs should help identify and develop MS **competitive advantages**

Identify **competitiveness challenges**



- Develop **strategic value chains**
- **Cost-effective** industrial transformation

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# Research and Innovation is the missing link for better integrated plans

- The Governance calls for **integrated** NECPs
  - Horizontal integration: across the 5 dimensions
  - Vertical integration: link 2030 and 2050 time horizons

>>> The plan needs to be more than a reiteration of existing national strategies or plans

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**An EU-wide assessment of National Energy and Climate Plans**

**Driving forward the green transition and promoting economic recovery through  
integrated energy and climate planning**

***2.3.3. Research, innovation and competitiveness***

**There final NECPs fail to pay sufficient attention to R&I needs for delivering on climate and energy objectives. There is an overall decrease in national budgets devoted to R&I in clean energy technologies and a severe lack of national objectives and funding targets that show concrete and relevant pathways to 2030 and 2050. Most of the plans also outline only funding of existing non-energy specific programmes that run for fewer than five years.**

**A new strategic approach to clean energy R&I and competitiveness is needed to rebuild the European economy and accelerate the innovation and market uptake of new technologies and innovation for climate neutrality. Both EU and national R&I policies as well as funding and national industrial strategies need to be better aligned with energy and climate objectives and be made operational through NECPs.**

## 2. NATIONAL OBJECTIVES AND TARGETS

### 2.5. Dimension research, innovation and competitiveness

- i. National objectives and funding targets for public and, where available, private research and innovation relating to the Energy Union including, where appropriate, a timeframe for when the objectives are to be met.
- ii. Where available, national 2050 objectives related to the promotion of clean energy technologies and, where appropriate, national objectives including long term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy- and carbon-intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure
- iii. Where applicable, national objectives with regard to competitiveness

## 3. POLICIES AND MEASURES

### 3.5. Dimension research, innovation and competitiveness

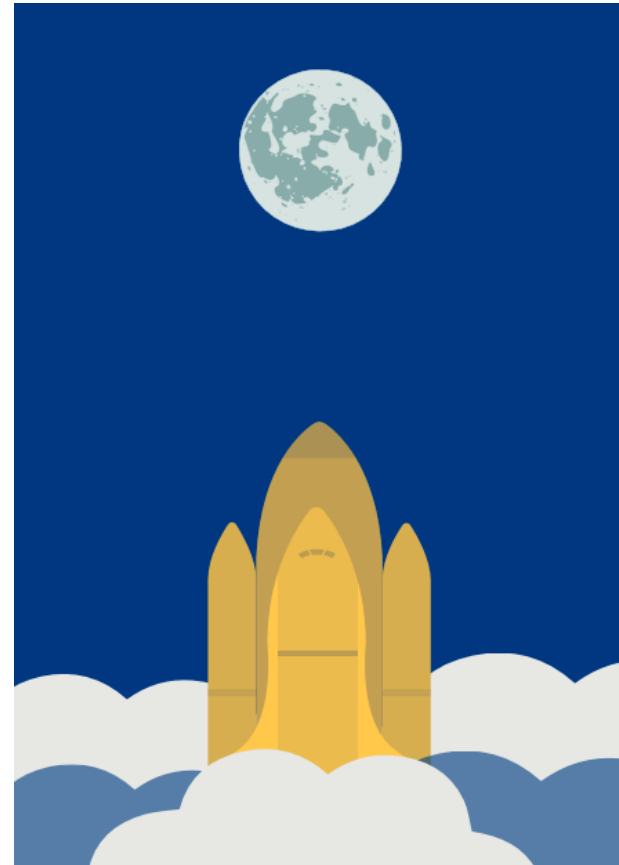
- i. Policies and measures related to the elements set out in point 2.5
- ii. Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context
- iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

## 4. ANALYTICAL BASIS

### 4.6. Dimension research, innovation and competitiveness

- i. Current situation of the low-carbon-technologies sector and, to the extent possible, its position on the global market (that analysis is to be carried out at Union or global level)
- ii. Current level of public and, where available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers
- iii. Breakdown of current price elements that make up the main three price components (energy, network, taxes/levies)
- iv. Description of energy subsidies, including for fossil fuels

## 5. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES



*ANNEX I***GENERAL FRAMEWORK FOR INTEGRATED NATIONAL ENERGY AND CLIMATE PLANS****Part 1**

## General framework

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# Examples

## 2.5 Funding targets

### **2.5 Dimension Research, innovation and competitiveness**

*(i) National objectives and funding targets for public and, where available, private research and innovation relating to the Energy Union including, if appropriate, a timeframe for when the objectives are to be met.*

As a participant in the international cooperation "Mission Innovation" Denmark has committed to double its public funding to research and development to 580 mio. DKK in 2020. The Danish parliament has recently reached a new energy agreement with the target of spending 1 billion DKK on energy research and development by 2024.

Denmark does not have any funding targets for private research and innovation relating to the energy union.

*X 2*

*Denmark*

*(Also Italy)*

which means an annual spending of 285m Euros. Considering the abovementioned, as well as the investments that have to be done up to 2030 to reach national targets, annual spending in research and innovation related energy and climate, for 2020 – 2030, has to be raised to 15m Euros, while currently it doesn't exceed 5m Euros.

*X 3*

Cyprus

## 2.5 ii Objectives

### Poland

- increase in the number of patent applications in energy sector entities and research institutes by 200 % as compared with 2018;

### Croatia

- switching as many activities as possible to the use of electricity (where technologically feasible and long-term cost-effective);

## Section 2.5 - National objectives and funding targets

- *Don't confuse funding targets with national objectives. The funding targets **should serve** to fill the national objectives*
- *When giving the RIC spending, it cannot be for all R&D, it **MUST** be **energy specific**.*
- *Moreover, it must be **year specific** (a timeline). Otherwise comparisons are not direct.*
- *Objectives should be **SMART** (specific, measurable, achievable, relevant, time-bound)*
- *Some plans do not go beyond a specific year (e.g. 2022)*

## Section 2.5 - National objectives and funding targets

- If a national strategy/plan/roadmap is mentioned, its key **priorities** and related funding, if any, should be elaborated*
- Most of the times the agreed **SET Plan objectives** are not reflected as national objectives*
- The section should include the **2050 objectives and targets**, if available. If not, possible scenarios/pathways identified may be indicated*

***Take away messages:***

***1. Energy specific***

***2. Year specific***

***Don't conflate funding targets with national objects.***

***Avoid wording inconsistency (Use the adopted regulation only)***

### **3. POLICIES AND MEASURES**

#### **3.5. Dimension research, innovation and competitiveness**

- i. Policies and measures related to the elements set out in point 2.5
- ii. *Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context*
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### 3. POLICIES AND MEASURES

#### 3.5. Dimension research, innovation and competitiveness

- i. Policies and measures related to the elements set out in point 2.5

#### Examples

**AU:** Pursuant to the new regulations, the NRP will apply until the Cabinet adopts (no later than by 31 March 2020) a new state science policy as part of which the priorities and strategic research programmes will be updated.

The updated strategic research directions in the field of energy and climate should be consistent with the Strategy for Responsible Development (SRD) and in the field of low-carbon technologies, additionally with the new Energy Policy for Poland 2040.



**CZ:** RDI priorities are valid for the period until 2030 with gradual progress. Within the defined 6 priority areas, there are 24 sub-areas with a total of 170 specific targets.

Area:	Sub-area:
Renewable energy sources	Developing economically efficient solar energy
	Developing economically efficient use of geothermal energy
	Developing economically efficient use of biomass
Nuclear sources	Efficient long-term use of existing nuclear power plants
	Supporting the safety of nuclear installations
	Research to support the construction and operation of new economically efficient and secure units
	Research and development of the fuel cycle
	Storage of radioactive waste and spent fuel
	Research and development of 4th generation reactors, especially efficient and safe fast reactors
Fossil energy sources	Economically efficient and environmentally-friendly fossil power and heating
Electric networks including energy storage	Capacity, reliability and safety of backbone transmission networks
	Modifying networks for 'demand-side management'
	Electricity storage, including the use of hydropower
	Security and resilience of distribution networks

## GR:

Numbering	Name of policy measure	Objective	Sector affected	Estimated impact (1: Very Low to 5: Very high)	Category of measure	State of implementation
M1.1	Development of innovative energy-saving technologies	Promotion of research and innovation	Energy efficiency, RES Consumer-focused smart energy system	5	Economic measure	Under implementation, Update-Reform
M1.2	Development of innovative decarbonisation technologies	Promotion of research and innovation Development of low-carbon technologies	RES Carbon capture, use and storage	5 4	Economic measure	Under implementation, Update-Reform
M1.3	Digitisation of energy networks - smart networks	Promotion of research and innovation	Consumer-focused smart energy system	5	Economic measure	Under implementation, Update-Reform
M1.4	Promotion of innovative technologies in transport	Promotion of research and innovation Development of low-carbon technologies	Sustainable transport	4 4	Economic measure	Under implementation, Update-Reform
M1.5	Development of innovative energy storage applications	Promotion of research and innovation	Sustainable transport Consumer-focused smart energy system	4	Economic measure	Under implementation, Update-Reform
M1.6	Implementation of horizontal measures for improving the conditions for conducting research	Promotion of research and innovation	All NECP subject fields	5	Regulatory measure	Envisaged
M1.7	Promotion of entrepreneurship through research and innovation actions which are embedded in the market functions	Improvement of competitiveness	All NECP subject fields	4	Economic measure	Under implementation, Update-Reform

**IT**: *A series of policies and measures have been put in place to achieve the objectives. The most significant consist of the following Funds:*

- *Electric System research fund*
- *Fund for actions and measures for technological and industrial developments*
- *Fund for the development of intangible capital*
- *Guarantee Fund*
- *Hyper-amortisation and super-amortisation*
- *Capital goods ('New Sabatini Law')*
- *...*

**LV**: *Measures laid down in GDSTI2020 for reaching R&D, innovation, and competitiveness objectives influencing the period covered by the Plan to be implemented indicatively in the period after 2020:*

*- Increasing competitiveness of the STI field (competent authority: MoES)*

*- Linking the STI industry with the needs of social and economic development (competent authorities: MoES, MoE)*

*- Continue to develop competence centres as a long-term platform for cooperation between scientific institutions and economic operators;*

*- ...*

*+ clear outcomes and funding allocated per each measure!*

### 3. POLICIES AND MEASURES

#### 3.5. Dimension research, innovation and competitiveness

- i. Policies and measures related to the elements set out in point 2.5

#### Weak points for improvement:

- *Policies and measures **are not always linked** to the objectives mentioned in section 2.5*
- *They can be **vaguely expressed**, lacking elaboration and information*
- *They can be **under preparation***
- *They include only policies, but **not measures** and allocation of **funding***
- *Policies related to the period **up to 2020** should not constitute the core section. Forward looking or updated policies should be developed*
- *Plans include some measures, but **not for 2030** (for ex. until 2020 or 2022).*
- *There is **no clear timeline***

### 3. POLICIES AND MEASURES

#### 3.5. Dimension research, innovation and competitiveness

- ii. *Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context*

#### Examples

*AU: is actively involved in selected SET Plan key actions currently focused on:*

- *new technologies and services for consumers*
- *resilience and security of the energy system*
- *new materials and technologies for buildings*
- *energy efficiency for industry*

Together with the Chamber of Commerce, a governance structure was set up in Austria for the purposes of participating in Mission Innovation. With the agreement of Austrian stakeholders, participation in Mission Innovation will initially focus on Smart Grids (ICI), Heating and Cooling of Buildings (IC7) and Hydrogen (IC8).

DK: *As a participant in the international cooperation "Mission Innovation", Denmark has committed to double its public funding to research and development to 580 mio. dkr. in 2020. The funding will be earmarked energy research and development on the annual state budget.*

*Denmark is an active member of Nordic Energy Research. According to its strategy for the period 2018-2021 the vision of NER is to create the knowledge basis for the Nordic countries to become global leaders in smart energy. The mission is progressed through Nordic collaboration.*





### 3. POLICIES AND MEASURES

#### 3.5. Dimension research, innovation and competitiveness

- ii. *Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context*

## Weak points for improvement

- *Mention only one international partnership, but without further elaboration*
- *No mention, even if the Member State is part of it and of specific Implementation Plans (IPs)*
- *Mention of consultation platform/forum on SET Plan but no elaboration*
- *Only mention of the framework, without elaborating on it and explaining how this is translated in national policies*
- *Sometimes collaborations are described, but without setting out how they contribute to achieve the national policies*
- ***No specific reference to all the IPs to which the Member State is part of and has agreed on specific targets and actions***
- *IPs actions and targets well described, but no link between the national objectives*
- *No clear **financing allocation** for related SET Plan actions*

### **3. POLICIES AND MEASURES**

#### **3.5. Dimension research, innovation and competitiveness**

*iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds*

#### Examples

IE: The Department of Business, Enterprise and Innovation is spearheading the Government's new €500 million Disruptive Technologies Innovation Fund.

This is one of four funds under the National Development Plan 2018-2027.

Applications under this fund must align with the aforementioned research priority areas, which include the Energy, Climate Action and Sustainability theme, and "Decarbonising the Energy System" research priority area.

SK: Estimated financial provision for the implementation of the outlook plan.

The indicative budget for the ENERGETIKA SRDP is 84,093 mil. EUR for 2024-2028.

The proposed budget below takes into account projected GDP growth and includes all three SRDP sub-programmes.

Year	2024	2025	2026	2027	2028	Total
State Budget	16.819	17.155	17.498	17.848	18.205	87.525

### 3. POLICIES AND MEASURES

#### 3.5. Dimension research, innovation and competitiveness

- ii. *Where applicable, cooperation with other Member States in this area, including, *where appropriate*, information on how the SET Plan objectives and policies are being translated to a national context*

### Weak points for improvement:

- *Reference to national funds, but **no detail of the budget***
- *They can be **under preparation***
- *Financing measures **up to 2020** should not constitute the core section. Forward looking financing measures should be foreseen*
- *When presenting the EU funds, it is not necessary to fully describe them, but rather to **focus on the national use of them***
- *Reference only to **one funding instrument** (i.e. Smart Specialisation Strategy)*
- ***Description** of budgetary management at national level, which may be **too detailed***

# *The RIC analytical basis (4.6) in the Governance Regulation*

## Annex I – Section B.4.6 Current and projections with existing policies and measures (RIC)

- i. Current situation of the **low-carbon-technologies sector** and, to the extent possible, its **position on the global market**
- ii. Current level of **public** and, where available, **private research and innovation spending on low-carbon-technologies**, current number of **patents**, and current number of **researchers**
- iii. Breakdown of **current price elements** that make up the main three price components (energy, network, taxes/levies)
- iv. Description of energy **subsidies**, including for fossil fuels

# *National submissions on the RIC analytical basis*

- A quantitative description of current situation of the different LCTs is often missing.
- Few Member States reported R&D investments specifically for LCTs
- There is limited information on numbers of patents and researchers.

## Coverage of topics by Member State:

1. Situation of the low-carbon tech sector (22)
2. Public & private R&D investments in LCTs (8)
3. Patents (15)
4. Researchers (3)

# *Key recommendations*

- Provide **quantitative** information, also for the situation of individual low-carbon technologies and their position in global markets
- For R&D spending, focus on the **low-carbon technology sector**
- Make **links with the analytical basis of other dimensions** of the Energy Union and the **model-based analysis**

Consider using 4.6 as a possible **benchmark for setting the level of ambition**, i.e. competitiveness objectives (2.5)

# Suggestions and potential sources of data

WHAT	WHERE (*)	SETIS																																																																																																																																																																																				
<ul style="list-style-type: none"> <li>Size of domestic clean energy market / domestic production, imports &amp; exports</li> <li>Number and annual turnover of new companies active in the sector</li> </ul>	ESTAT COMEXT, UN COMTRADE National stakeholders: Industrial associations, Chamber of Commerce, ...	<p><b>Private R&amp;I investment in energy technologies</b></p> <p>Investment in 2014 (EUR million)</p> <table border="1"> <thead> <tr> <th>Technology</th> <th>2007</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2012</th> <th>2013</th> <th>2014</th> </tr> </thead> <tbody> <tr> <td>Renewable energy technologies</td> <td>1310</td> <td>1042</td> <td>982</td> <td>874</td> <td>814</td> <td>830</td> <td>842</td> <td>915</td> </tr> <tr> <td>Smart solutions for consumers</td> <td>121</td> <td>201</td> <td>132</td> <td>124</td> <td>204</td> <td>220</td> <td>201</td> <td>218</td> </tr> <tr> <td>Integrated &amp; flexible energy system</td> <td>108</td> <td>108</td> <td>141</td> <td>142</td> <td>112</td> <td>100</td> <td>104</td> <td>104</td> </tr> <tr> <td>Energy efficiency in buildings</td> <td>62</td> <td>70</td> <td>102</td> <td>131</td> <td>174</td> <td>154</td> <td>151</td> <td>157</td> </tr> <tr> <td>Energy efficiency in industry</td> <td>214</td> <td>355</td> <td>214</td> <td>287</td> <td>283</td> <td>304</td> <td>307</td> <td>313</td> </tr> <tr> <td>Batteries &amp; e-mobility</td> <td>1216</td> <td>1507</td> <td>2020</td> <td>2214</td> <td>4000</td> <td>4020</td> <td>4220</td> <td>2015</td> </tr> <tr> <td>Renewable fuels &amp; bioenergy</td> <td>878</td> <td>1251</td> <td>1480</td> <td>1437</td> <td>1424</td> <td>1484</td> <td>1771</td> <td>1800</td> </tr> <tr> <td>CCUS</td> <td>215</td> <td>218</td> <td>210</td> <td>214</td> <td>210</td> <td>228</td> <td>221</td> <td>213</td> </tr> <tr> <td>Nuclear safety</td> <td>305</td> <td>133</td> <td>103</td> <td>130</td> <td>100</td> <td>104</td> <td>100</td> <td>100</td> </tr> </tbody> </table> <p>(c) JRC 2016</p> <p><b>Trends in energy technology patents</b></p> <p>Number of inventions in 2014</p> <table border="1"> <thead> <tr> <th>Technology</th> <th>2007</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2012</th> <th>2013</th> <th>2014</th> </tr> </thead> <tbody> <tr> <td>Renewable energy technologies</td> <td>627</td> <td>1014</td> <td>1220</td> <td>1442</td> <td>1750</td> <td>1829</td> <td>1814</td> <td>1378</td> </tr> <tr> <td>Smart solutions for consumers</td> <td>177</td> <td>117</td> <td>117</td> <td>117</td> <td>117</td> <td>117</td> <td>117</td> <td>117</td> </tr> <tr> <td>Integrated &amp; flexible energy system</td> <td>179</td> <td>213</td> <td>244</td> <td>321</td> <td>346</td> <td>378</td> <td>378</td> <td>378</td> </tr> <tr> <td>Energy efficiency in buildings</td> <td>101</td> <td>119</td> <td>220</td> <td>220</td> <td>272</td> <td>218</td> <td>121</td> <td>121</td> </tr> <tr> <td>Energy efficiency in industry</td> <td>170</td> <td>628</td> <td>696</td> <td>725</td> <td>874</td> <td>1185</td> <td>1221</td> <td>1257</td> </tr> <tr> <td>Batteries &amp; e-mobility</td> <td>420</td> <td>550</td> <td>622</td> <td>700</td> <td>1100</td> <td>1420</td> <td>1420</td> <td>1420</td> </tr> <tr> <td>Renewable fuels &amp; bioenergy</td> <td>408</td> <td>432</td> <td>430</td> <td>431</td> <td>411</td> <td>730</td> <td>710</td> <td>710</td> </tr> <tr> <td>CCUS</td> <td>25</td> <td>32</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>100</td> <td>111</td> </tr> <tr> <td>Nuclear safety</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> <td>11</td> </tr> </tbody> </table> <p>(c) JRC 2016; adapted from EPO PATSTAT (spring 2016)</p>	Technology	2007	2008	2009	2010	2011	2012	2013	2014	Renewable energy technologies	1310	1042	982	874	814	830	842	915	Smart solutions for consumers	121	201	132	124	204	220	201	218	Integrated & flexible energy system	108	108	141	142	112	100	104	104	Energy efficiency in buildings	62	70	102	131	174	154	151	157	Energy efficiency in industry	214	355	214	287	283	304	307	313	Batteries & e-mobility	1216	1507	2020	2214	4000	4020	4220	2015	Renewable fuels & bioenergy	878	1251	1480	1437	1424	1484	1771	1800	CCUS	215	218	210	214	210	228	221	213	Nuclear safety	305	133	103	130	100	104	100	100	Technology	2007	2008	2009	2010	2011	2012	2013	2014	Renewable energy technologies	627	1014	1220	1442	1750	1829	1814	1378	Smart solutions for consumers	177	117	117	117	117	117	117	117	Integrated & flexible energy system	179	213	244	321	346	378	378	378	Energy efficiency in buildings	101	119	220	220	272	218	121	121	Energy efficiency in industry	170	628	696	725	874	1185	1221	1257	Batteries & e-mobility	420	550	622	700	1100	1420	1420	1420	Renewable fuels & bioenergy	408	432	430	431	411	730	710	710	CCUS	25	32	100	100	100	100	100	111	Nuclear safety	11	11	11	11	11	11	11	11
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Private R&I investments on LCT	National surveys, JRC/SETIS																																																																																																																																																																																					
Patents on LCT	National Patent Offices, EPO/PATSTAT, JRC/SETIS																																																																																																																																																																																					
Researchers in LCTs	e.g., EERA, EUA																																																																																																																																																																																					

(\*) Forthcoming JRC Note



#### 4.6. Dimension research, innovation and competitiveness

- i. Current situation of the low-carbon-technologies sector and, to the extent possible, its position on the global market (that analysis is to be carried out at Union or global level)
- ii. Current level of public and, where available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers
- iii. Breakdown of current price elements that make up the main three price components (energy, network, taxes/levies)
- iv. Description of energy subsidies, including for fossil fuels

### **Weak points for improvement:**

- **Limited description** of the state of play of the different technologies;
- Quantitative indicators are missing;
- Level of ambition unclear as **benchmarks** are missing;
- Most of the times, lack of number of **patents**;
- Lack of info on **subsidies**.

# Research and Innovation in the NECPs

Room for improvement between draft and final NECPs

- Member States acknowledge the importance of R&I and the interlinkages between R&I and the other dimensions.
- But only rarely set specific targets nor policies and measures.
- There are some good examples.

# ASSESSMENT

## RESEARCH AND INNOVATION

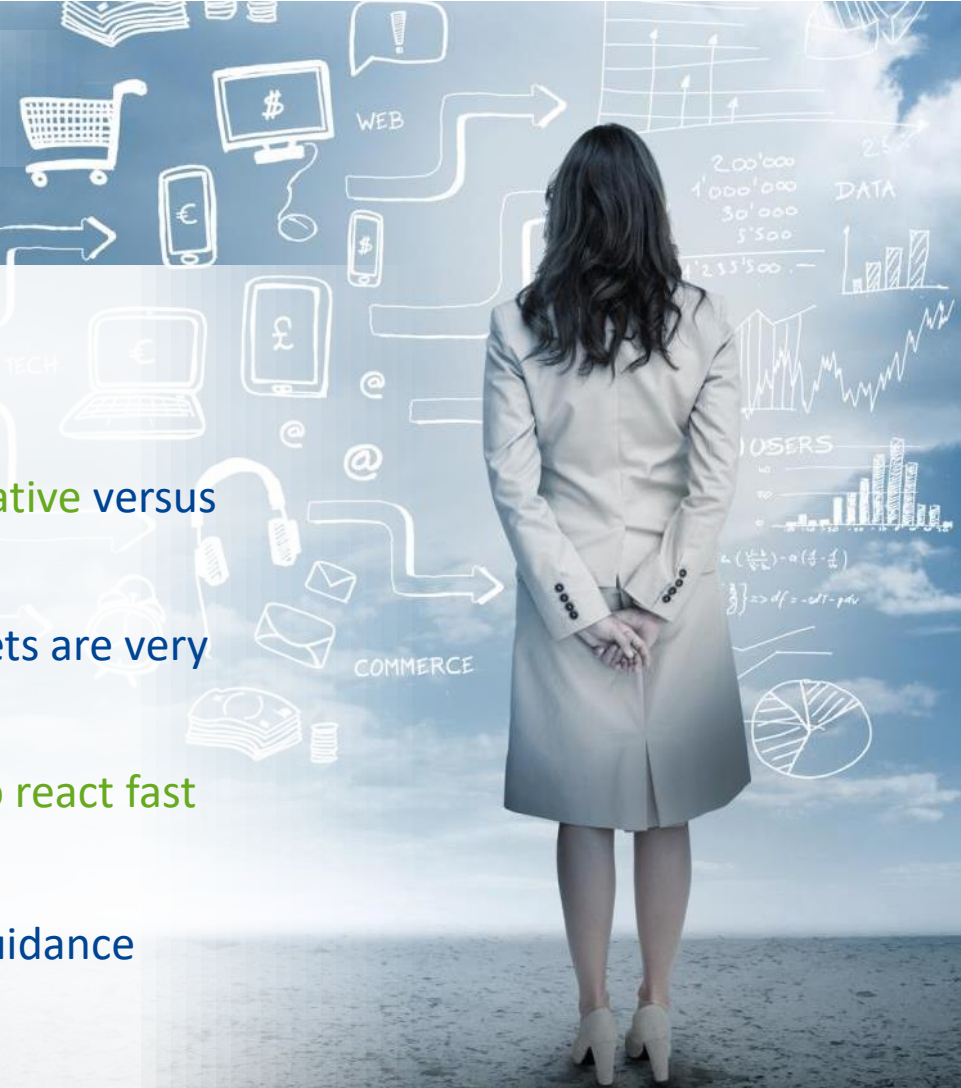
- MS to make **additional efforts to integrate research and innovation** into their NECPs
- Links with priorities identified in the **Strategic Energy Technology Plan (SET Plan)** should be better explored
- The Commission's Long Term Strategy (LTS) highlights the **need for a massive coordinated effort**



**28 MS received recommendations to the draft plans related to research and innovation**

# Draft NECP observations

- There are many **good examples**
- NECPs are **heterogeneous**
- NECPs are often ambiguous on **normative versus descriptive**
- **Not enough funding** in MS; RIC budgets are very reliant on EU support for many MS
- The European Commission is **ready to react fast with funding**
- Use the updated **“non-paper”** for guidance



**Thank you for your time**

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